Chapter Two
FORECASTS OF AVIATION DEMAND

FORECASTS

Facility planning begins with the definition of activity demands that may be expected to occur over the twenty-year planning period. For Sierra Vista Municipal Airport, a joint-use facility with Libby Army Airfield, it involves the forecasts of commercial service, general aviation, and military activity. The resulting forecasts may be used for several purposes, including facility needs assessments, airfield capacity evaluation, projected airport revenue analysis, and environmental evaluations. The forecasts will be reviewed by the Federal Aviation Administration (FAA) to ensure that they are reasonable projections of aviation activity.

It is virtually impossible to predict with certainty year-to-year fluctuations of activity when looking twenty years into the future. Because aviation activity can be affected by many influences at the local, regional, and national level, it is important to remember that forecasts are developed to serve only as guidelines;

planning must remain flexible enough to respond to unforeseen facility needs. To maintain this flexibility, the facility demands must be regularly reviewed.

The last master plan was undertaken in 1995 at a time when general aviation had not yet recovered from a recessionary period and military activity at Fort Huachuca had declined significantly as a result of the reconstruction of the primary runway. Since that time, the City of Sierra Vista has constructed additional storage

hangars (fully occupied), based general aviation aircraft have increased by over 50 percent, and military activity has returned to the levels experienced in the early 90s. The City of Sierra Vista has pursued (from the Department of the Army) the transfer and development of 203 acres located between existing property and State Route 90.

In order to provide updated passenger and operational projections, the following forecast analysis examines recent developments in aviation activity on a national basis, local socioeconomic trends and service areas, and changes in forecast indicators at Sierra Vista Municipal Airport. The intent is to permit the City of Sierra Vista to make the planning adjustments necessary to ensure that the facility meets projected demands in an efficient and cost effective manner.

NATIONAL AVIATION TRENDS

Each year, the FAA publishes its national aviation forecast. Included in this publication are forecasts for major and regional air carriers, air cargo, general aviation, and military activity. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition when this chapter was prepared was *FAA Aerospace Forecasts - Fiscal Years 2000-2011*. The forecast uses the economic performance of the U.S. as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

For the U.S. aviation industry, the outlook for the next twelve years is for moderate economic growth and inflation and declining fuel prices (after an expected one-year spike in 2000). Based on these assumptions, scheduled domestic passenger airline enplanements are forecast to increase 54.6 percent - major air carriers increasing by 52.8 percent and regional air carriers increasing by 90.1 percent.

COMMERCIAL AIR CARRIERS

The commercial air carriers experienced a sixth consecutive year of growth in 1999. Passenger enplanements grew by 3.5 percent over 1998. This growth is attributed, in part, to the strong U.S. economy. System capacity (measured in available seat miles) increased by 4.6 percent and outpaced enplanement growth, resulting in the commercial air carrier industry recording its second highest load factor of 70.8 percent.

The commercial air carriers also experienced a sixth consecutive year of profits. Between 1990 and 1993, U.S. carriers' cumulative net losses totaled over $11 billion. Since 1994, the industry's cumulative net profits have totaled $20 billion. In 1999, industry profits totaled $8.5 billion. The

industry will need similar (or higher) profits over the next several years to finance the addition of new fleet aircraft.

New aircraft deliveries to commercial air carriers totaled 358 in FY 1999, the largest number of deliveries since 1968. Of this total, 195 (54.5 percent) were for two-engine narrowbody aircraft, 41 (11.5 percent) were for two-engine widebody aircraft, and 100 (27.9 percent) were for regional aircraft.

The relatively large increase in new aircraft deliveries in 1999 is the result of the continued growth in orders for new aircraft. Over the past three years the commercial air carriers have combined to order 2,124 new aircraft.

Approximately 639 new aircraft were ordered by the commercial air carriers in 1999. The demand for narrowbody aircraft continues to outpace the demand for widebody aircraft, accounting for nearly 70 percent of new aircraft orders last year. Regional jets accounted for 8.9 percent of the orders in 1999 (57 aircraft).

While there are a number of positive signs that point towards a continuation of the current rebound in commercial aviation, there are also a number of uncertainties that could limit the growth of the economy, and ultimately, the demand for aviation services. These include the strength and duration of the current U.S. economic expansion, the continuing recovery of the Asia/Pacific financial crisis of 1997-98, strength and duration of economic growth in Europe and Latin America, and future oil prices.

The ability of the commercial air carriers to respond to market changes will also be important. Current market trends include: 1) the ability of air carriers to competitively adapt prices on discounted seats to maximize revenues and profits, 2) the growth of low-cost carriers, 3) continued efforts towards restructuring and lowering unit costs for improved profitability and lower fares, 4) expanding global alliances, 5) increased efficiency and profitability, and 6) declining real fares. Increased sensitivity by business travelers to the cost of air travel and alternatives to air travel (such as video conferencing) increase pressure on the air carriers to continue to lower costs and fares to expand their market.

Consumer preferences have changed in favor of air travel for recreational travel due to increasing disposable income and expanding personal wealth. Lower relative fares and expanded capacity have significantly increased the number of air travelers and the number of leisure air travelers. A continued decline in fares supported by increasing productivity and growth in capacity will be needed to assure growth in demand and yields to the carriers.

The FAA's projections for domestic commercial service passenger enplanements indicate relatively strong growth. Domestic enplanements are projected to grow at an average annual rate of 3.6 percent through the year 2011. The forecast assumes

enplanements will grow at 3.2 percent in 2000, then slow to 2.9 percent for the next three years in response to an overall slowing of the U.S. economy. Over the last 8 years of the forecast period, enplanements are expected to increase 3.9 percent annually. Aircraft operations are forecast to increase at 2.8 percent annually.

The U.S. passenger jet aircraft fleet is expected to increase by approximately 274 aircraft annually (after retirements) through the planning period, increasing from 4,655 aircraft in 1999 to 7,946 aircraft in 2011. The passenger jet fleet is expected to continue the trend of experiencing increases in two-engine narrowbody and widebody aircraft and declines in three-engine narrowbody and widebody aircraft. A slight increase in four-engine widebody aircraft (1.2 percent annually) is expected through the planning period. The regional jet fleet is projected to increase at 13.4 percent annually through the planning period and account for nearly 20 percent of the passenger jet fleet in 2011. **Exhibit 2A** graphically presents the FAA's air carrier forecasts.

REGIONAL/ COMMUTER AIRLINES

The regional/commuter airline industry consists of air carriers providing scheduled service with a fleet of aircraft with (generally) less than 60 passenger seats. However, this is expected to change in the future as regional airlines add larger regional jets to their operating fleets.

Similar to the commercial air carriers, the smaller regional/commuter airlines experienced continued growth in1999, but at a much higher rate than the major airlines. In 1999, passenger enplanements on regional/commuter airlines increased 12 percent over 1998. Even with a 17.5 percent increase in capacity, the regional/commuter airline industry experienced an all-time high load factor of 57.5 percent in 1999 (the 1998 record was 56.5 percent).

The regional/commuter airline industry recorded its 11th consecutive quarter of improving operating profits in 1999. Operating profits increased 9.3 percent in 1999 to over $7.0 billion. With operating expenses increasing only 8.7 percent, the industry recorded a combined operating profit of $695.9 million, 15.5 percent higher than the $602.5 million in 1998.

The regional/commuter airline industry continues to be the strongest growth segment of the commercial air carrier industry. Three factors have contributed to this: 1) the dramatic growth in code sharing agreements between the major air carriers and regional airlines, 2) the acquisition of equity interest by the major air carriers in the regional/commuter airline code-sharing partners which has led to the transfer of a large number of short-haul jet routes to their regional/commuter airlines, and 3) the introduction of the regional jet into the regional/commuter

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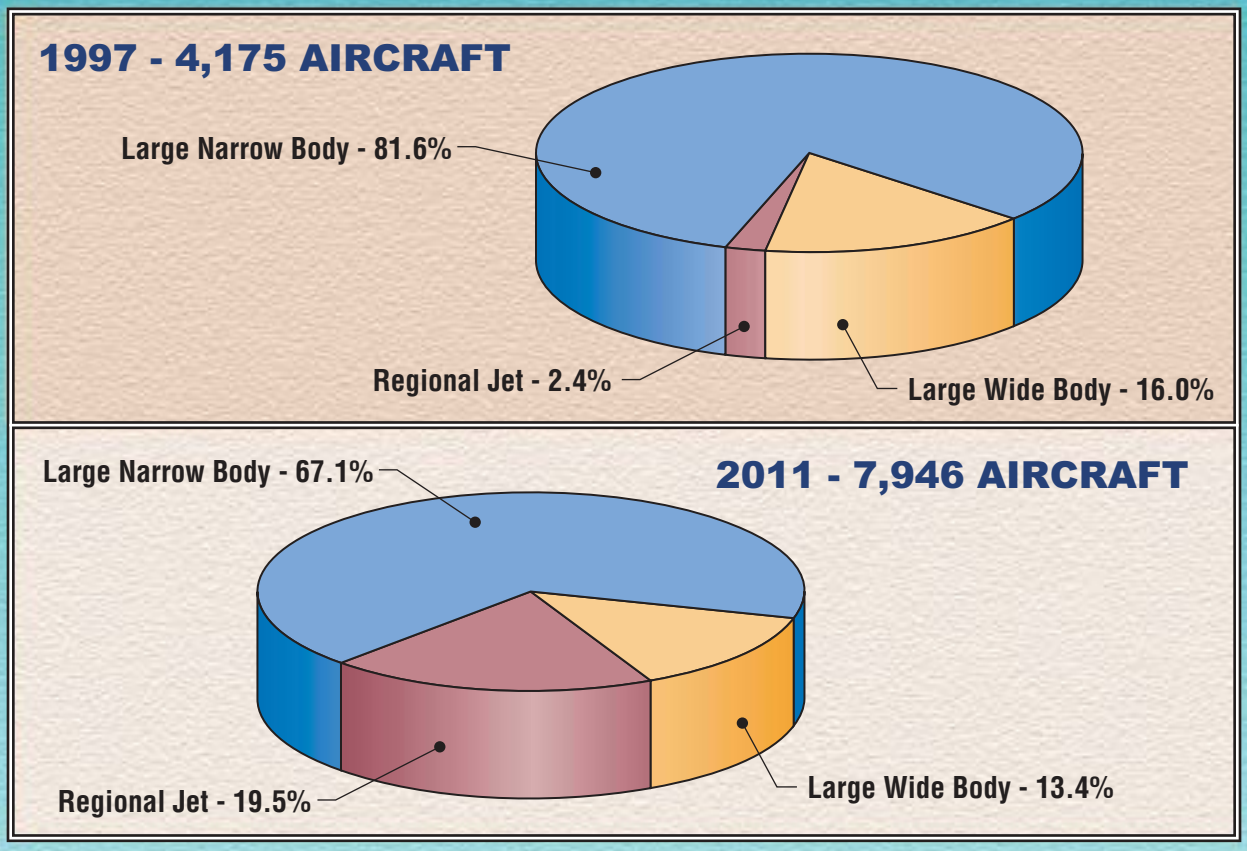
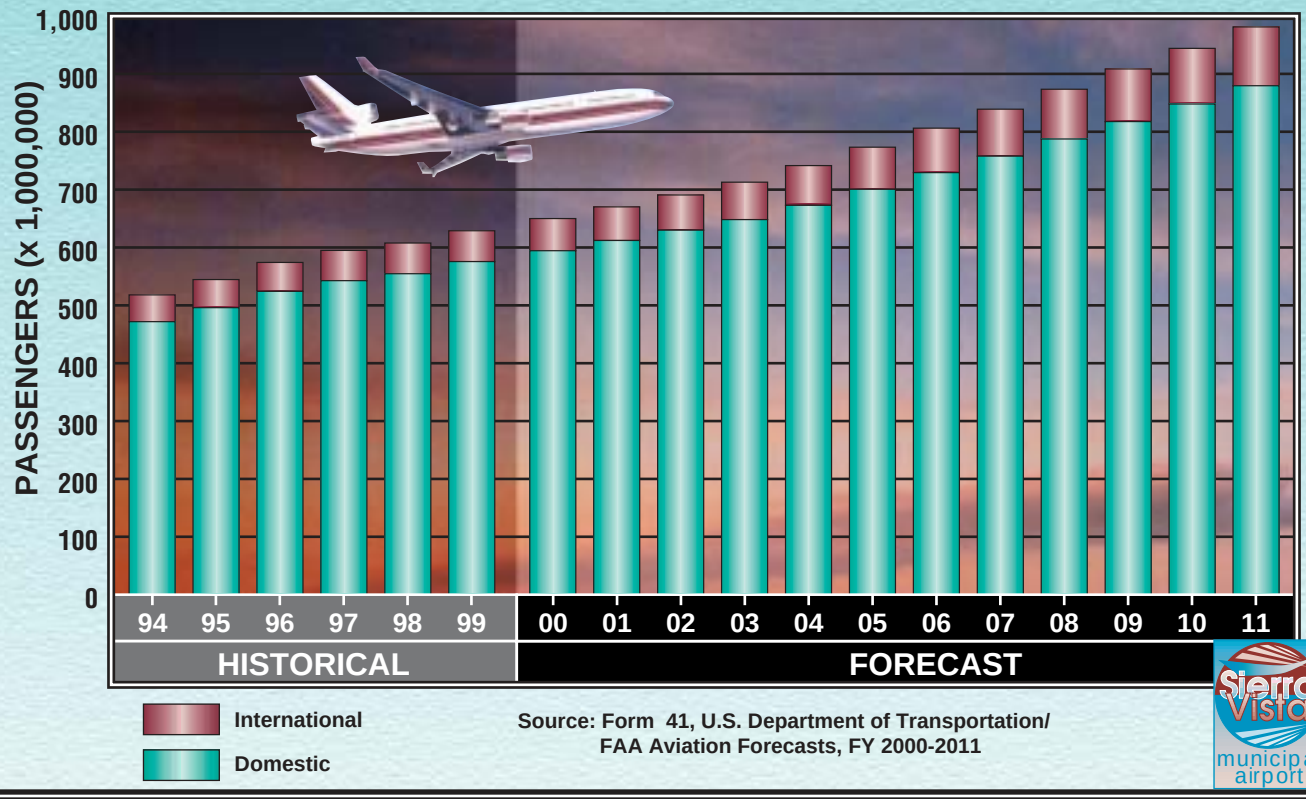
PASSENGER JET AIRCRAFT



Source: FAA Aviation Forecasts, FY 2000-2011

SCHEDULED COMMERCIAL PASSENGER ENPLANEMENTS



Source: Form 41, U.S. Department of Transportation/
FAA Aviation Forecasts, FY 2000-2011

Sierra Vista municipal airport

Exhibit 2A
U.S. COMMERCIAL FORECASTS

airline fleet. While the primary role (providing feeder service to the major air carrier hubs) of the regional/ commuter airline industry has not changed over the years, the regional jet should provide new growth opportunities to serve distant point-to-point markets.

Industry growth is expected to continue to outpace that of the larger commercial air carriers. The introduction of new state-of-the-art aircraft, especially high-speed turboprops and regional jets with ranges of up to 1,000 miles, is expected to open up new opportunities for growth in non-traditional markets. However, the primary role of the regional airline industry will remain that of feeding traffic to the major and national carriers even as they expand into markets with longer route segments.

The regional airline industry will continue to benefit from the continued integration with the larger air carriers. The continued need for larger commercial air carriers to reduce costs and fleet size will ensure that these carriers continue to transfer smaller, marginally profitable routes to the regional air carriers. The increased use of regional jets is expected to lead to another round of route rationalization by the larger commercial carriers, particularly on low-density routes in the 500-mile range. Regional jet aircraft can serve these markets with the speed and comfort of a larger jet, while at the same time providing greater service frequency that is not economically feasible with the larger jet. This is expected to contribute to strong growth during the early portion of the planning period, although this phenomenon is expected to diminish during the mid to latter portion of the planning period.

The high load factors of the larger air carriers is also expected to contribute to a slowing of passenger enplanement growth in the latter portions of the planning period. High load factors diminish the need and value of feeder traffic and the ability of the larger air carrier to handle increases in feeder traffic.

System capacity is expected to increase at a higher rate than enplanements through the planning period due to the introduction of larger aircraft (which fall within a 41 to 60 seat range) with longer-range capabilities. This will open up new markets for the regional airlines. The emphasis will be on schedule frequency.

The FAA projects regional/commuter airline passenger enplanements to increase by 8.1 percent in 2000, then slow to 5.6 percent over the next four years as the U.S. economy is expected to slow. Overall, passenger enplanements are expected to increase at 5.5 percent annually during the forecast period. The average seats per aircraft is also projected to grow, from 36 seats in 1999 to 44.3 seats in 2011. **Exhibit 2B** depicts the regional/commuter forecasts.

GENERAL AVIATION TRENDS

By most statistical measures, general aviation recorded its fifth consecutive

year of growth. Following more than a decade of decline, the general aviation industry was revitalized with the passage of the *General Aviation Revitalization Act of 1994* (federal legislation which limits the liability on general aviation aircraft to 18 years from the date of manufacture). This legislation sparked an interest to renew the manufacturing of general aviation aircraft due to the reduction in product liability, which had become a major factor in the decisions by many American aircraft manufacturers to slow or discontinue the production of general aviation aircraft.

According to the General Aviation Manufacturers Association (GAMA), aircraft shipments and billings grew for the fifth consecutive year in 1999, following fourteen years of annual declines. In the first three quarters of 1999, general aviation aircraft manufacturers shipped a total of 1,692 aircraft, 13.4 percent higher than the same period in 1998. Shipments of piston aircraft and jets were up 10.8 and 26.2 percent, respectively. Turboprop shipments increased 14.8 percent in 1998 and 8.6 percent through the first three quarters of 1999.

Both the number of active pilots and student pilot starts were up in 1998. Total active pilot numbers increased by 3.5 percent in 1999 over 1998, eclipsing the 0.3 percent gain the previous year. For 1999, student pilot starts increased for the third consecutive year, increasing by 4.4 percent over 1998. These student pilots are the future of general aviation and are one of the key factors impacting the future direction of the general aviation industry. Since most pilot training activities are conducted using general aviation aircraft, the increases in new pilot starts and increases in advanced training are one of the primary reasons for the resurgence in general aviation over the past few years. These increases, combined with the increases in piston-powered aircraft shipments and aircraft production, are tangible evidence of the resurgence of the industry and that many of the industry initiated programs to revitalize general aviation have begun to yield substantive results.

Manufacturer and industry programs and initiatives continue to revitalize the general aviation industry. Notable initiatives include the "No Plane, No Gain" campaign sponsored by GAMA and the National Business Aviation Association (NBAA), "Project Pilot" sponsored by the Aircraft Owners and Pilots Association (AOPA), the "Learn to Fly" campaign sponsored by the National Air Transportation Association (NATA), and "GA Team 2000", which is sponsored by more than 100 industry organizations. The "No Plane, No Gain" campaign is a program promoting the cost effectiveness of using general aviation aircraft for business and corporate uses. "Project Pilot" and "Learn to Fly" are programs promoting training of new pilots.

The general aviation industry is also launching new programs to make aircraft ownership easier and more affordable. The New Piper Aircraft

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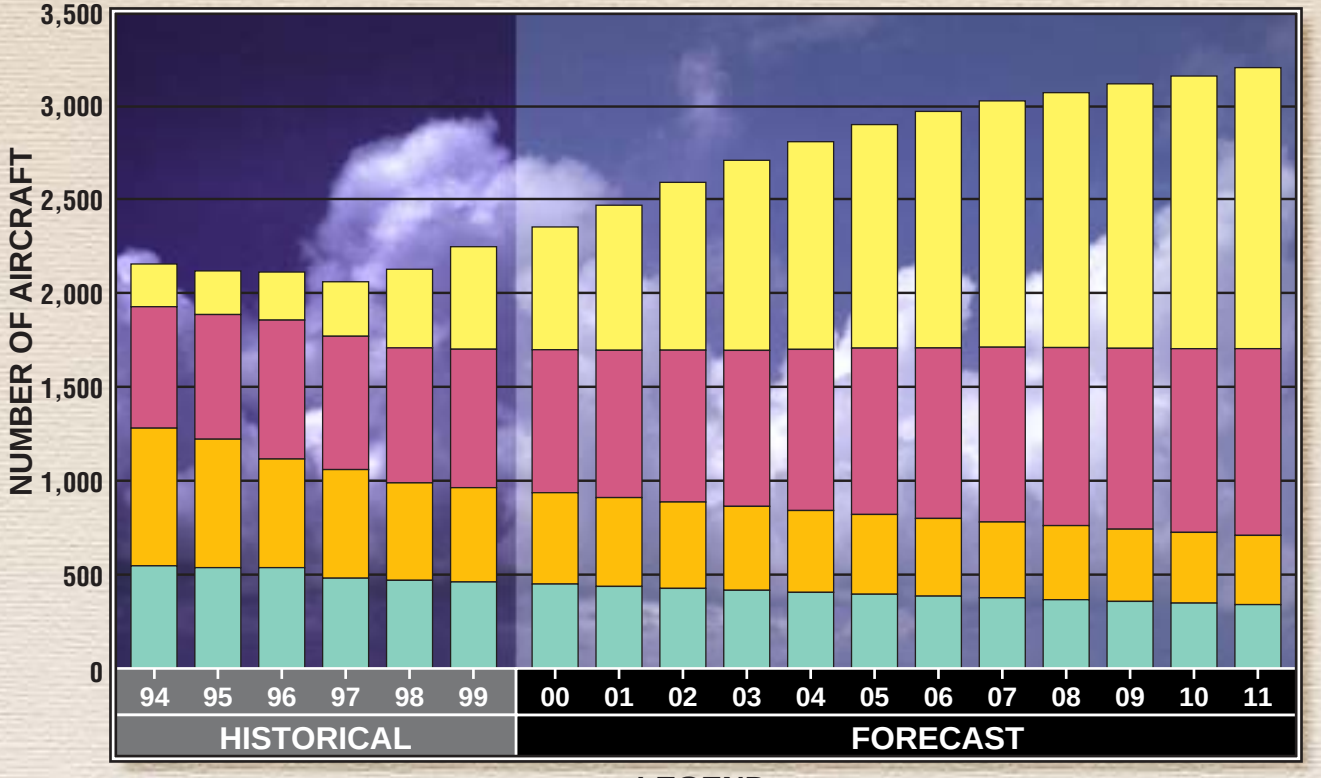
PASSENGER AIRCRAFT

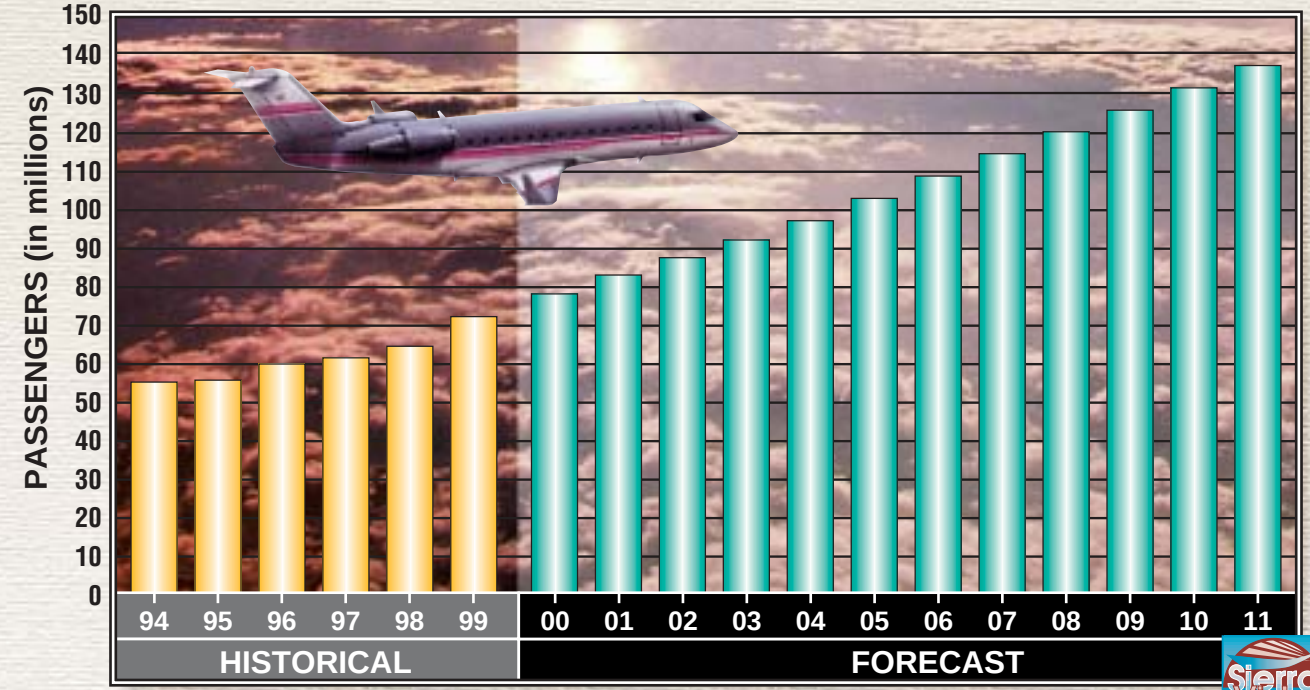


LEGEND

Less than 15 Seats | 15 - 19 Seats | 20 - 40 Seats | 41 Seats or More

Source: FAA Aircraft Utilization and Propulsion Reliability Report/FAA Aviation Forecasts, FY 1998-2009

SCHEDULED PASSENGER ENPLANEMENTS



Source: BTS, Form's 298-C and 41, U.S. Department of Transportation/
FAA Aviation Forecasts, FY 1999-2010

Sierra Vista municipal airport

Exhibit 2B
U.S. REGIONAL/COMMUTER FORECASTS

company has created Piper Financial Services (PFS) to offer competitive interest rates and/or leasing of Piper aircraft. The Experimental Aircraft Association (EAA) offers financing for kit built airplanes through a private lending institution.

General aviation activity at towered airports increased for the third consecutive year in 1999, up 5.2 percent over 1998. For the three year period, operations at towered airports were up 13.4 percent. The largest gain was in local (training) operations, up 6.5 percent in 1999. Itinerant operations were up 4.3 percent. Since 1996, local operations are up 17.4 percent and itinerant operations are up 10.7 percent. The gain in local operations coincides with the gains in student pilot starts. General aviation growth is not limited strictly to general aviation airports. Three of the top ten airports showing the fastest growth in general aviation operations are large hub commercial service airports (Dallas/Fort Worth, Minneapolis/St. Paul and Covington/ Cincinnati), signifying the change in the general aviation fleet to include larger, more sophisticated turboprop and turbojet aircraft which require air traffic services and airport facilities similar to commercial air carriers.

Instrument operations at towered airports and general aviation aircraft handled at en route traffic control centers increased 4.8 percent and 1.9 percent, respectively, in 1999. Instrument operations have increased five of the past six years, with activity gains totaling 17.4 percent over the period. The number of general aviation aircraft handled at en route traffic control centers increased for the eighth consecutive year in 1999. These increases accompany the expanding fleet of sophisticated turboprop and turbojet aircraft in the general aviation fleet and the expansion in use of these aircraft for business/corporate uses.

The most notable trend in general aviation is the continued strong use of general aviation aircraft for business and corporate uses. For 1998 (the most current year of data), business and corporate use of general aviation aircraft represented 23.9 percent of general aviation activity. These uses accounted for 21.2 percent of general aviation activity in 1997.

The most striking industry trend is the continued growth in fractional ownership programs. Fractional ownership programs allow businesses and individuals to purchase an interest in an aircraft and pay for only the time that they use the aircraft. This has allowed many businesses and individuals (who might not otherwise) to own and use general aviation aircraft for business and corporate uses. Several companies involved in the fractional ownership market include: Executive Jets' Netjets, Bombardier Aerospace's Flexjet, and Raytheon's Travel Air. Between 1993 and 1998, these companies expanded their fleet and shareholders by 65.2 percent and 66.1 percent, respectively. In 1999, the fractional jet fleet totaled 329 and shareholders totaled 1,567. Since 1993,

Executive Jet has ordered 368 new aircraft and is purportedly the single largest nonmilitary purchaser of aircraft.

While the fractional ownership industry is rapidly expanding, new attention has been given to the regulatory oversight of the industry. Presently, fractional providers operate under Federal Aviation Regulation (FAR) Part 91, which governs general aviation aircraft. However, there is pressure for fractional ownership providers to operate under FAR Part 135, which governs air carriers, air taxi and charter operators. Part 135 operators regard the fractional ownership providers as competitors, benefitting from the less restrictive FAR Part 91 standards. The FAA commissioned a formal rulemaking committee to analyze regulatory requirements for the industry. Their report, released in Spring 2000, recommended that fractional ownership providers operate under a new subpart of FAR Part 91. The FAA is now reviewing this proposal. A formal rulemaking proposal could be made within a year.

The fractional ownership providers are concerned about a move to regulate them as FAR Part 135 operators. FAR Part 135 standards would restrict the number and type of airports at which they operate by requiring longer runways and approved weather reporting. If the providers were required to operate under FAR Part 135, they would not be treated as private owners in foreign countries, requiring international bilateral agreements.

Exhibit 2C depicts the FAA forecast for active general aviation aircraft in the United States. The FAA forecasts general aviation active aircraft to increase at an average annual rate of 0.9 percent over the planning period. General aviation aircraft are projected to increase from 204,710 in 1998 to 230,995 in 2011.

Turbine-powered aircraft are projected to grow faster than all other segments of the national fleet, growing at 3.2 percent annually through the year 2011. Turbojet aircraft are projected to provide the largest portion of this growth, growing at 4.9 percent annually. Turboprop aircraft are projected to grow at 1.2 percent annually. The strong growth projected for the turbojet aircraft is the result of the strong U.S. and worldwide economy, growth in the fractional ownership industry, new product offerings (which include both new entry level aircraft and long range global jets) and a shift from commercial air travel to corporate/business air travel by many business travelers and corporations.

Although the general aviation active fleet is projected to increase at less than one percent annually, general aviation hours flown are forecast to increase by 1.7 percent annually over the planning period. The total pilot population is projected to grow at 2.1 percent annually.

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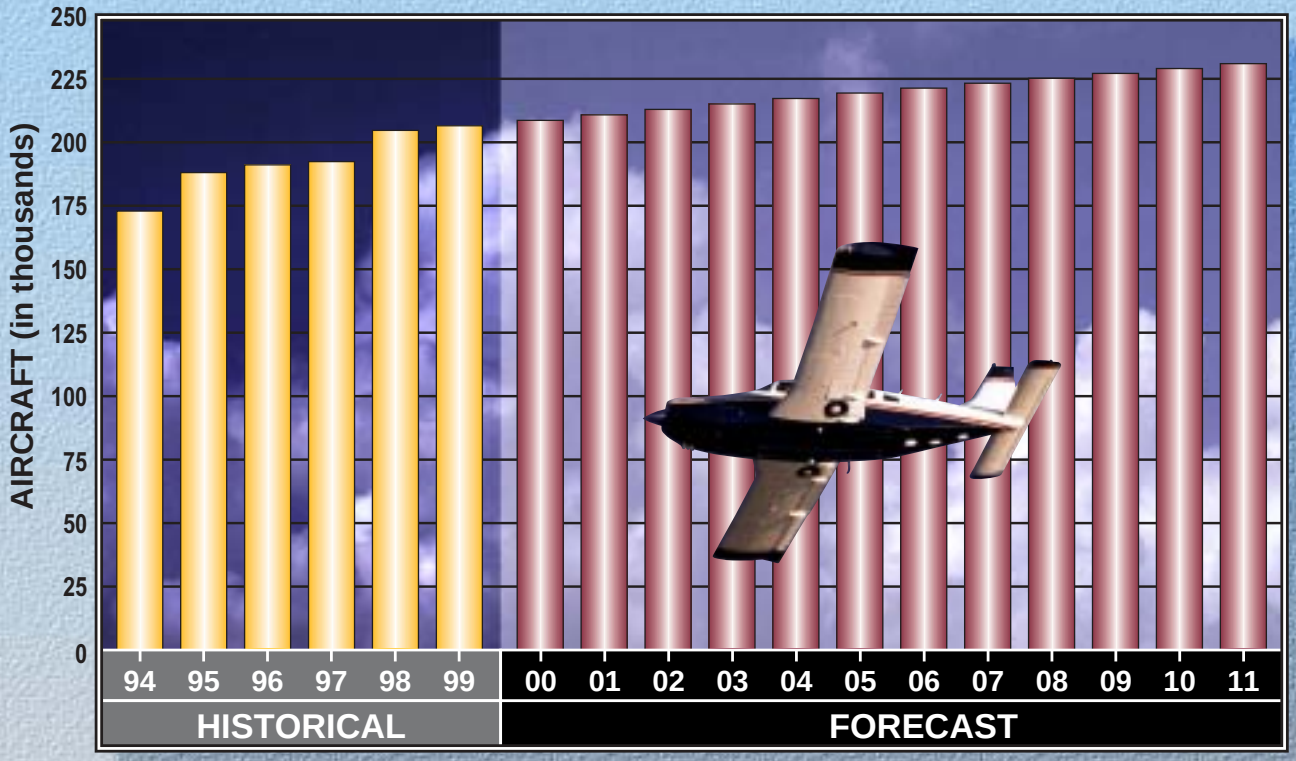
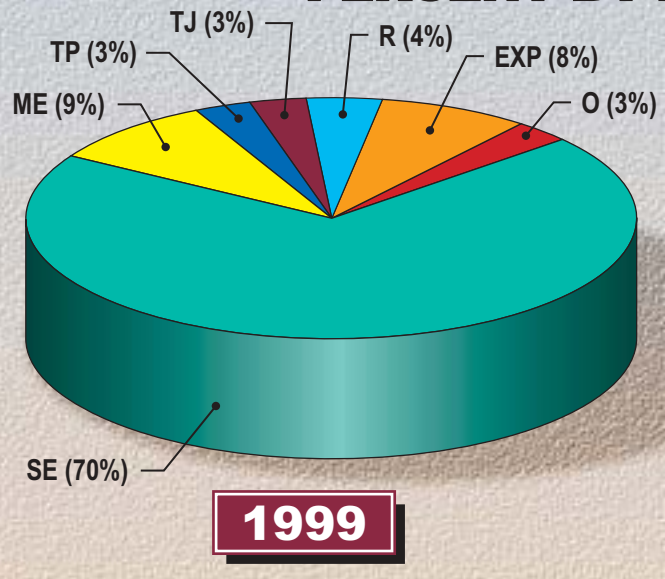
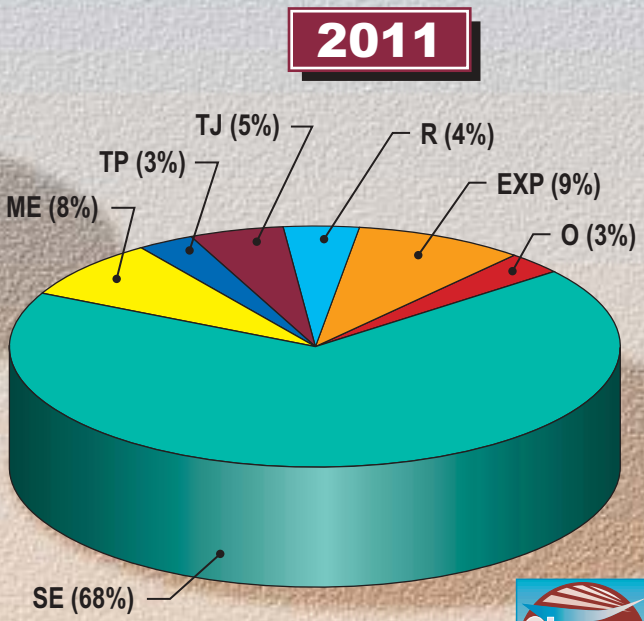
ACTIVE GENERAL AVIATION AIRCRAFT



Source: FAA Aviation Forecasts, FY 2000-2011

PERCENT BY AIRCRAFT TYPE





SE Single-Engine Piston
ME Multi-Engine Piston
TP Turboprop
TJ Turbojet
R Rotorcraft
EXP Experimental
O Other

Sierra Vista municipal airport

Exhibit 2C
U.S. ACTIVE GENERAL AVIATION AIRCRAFT FORECASTS

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships are tested to establish statistical logic and rationale for projected growth. However, the judgement of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and their assessment of the local situation, is important in the final determination of the preferred forecast.

It is important to note that one should not assume a high level of confidence in forecasts that extend beyond five years. Facility and financial planning usually require at least a ten-year preview, since it often takes more than five years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors are known to influence the aviation industry and can have significant impacts on the extent and nature of air service provided in both the local and national market. Technological advances in aviation have historically altered, and will continue to change, the growth rates in aviation demand over time. The most obvious example is the impact of jet aircraft on the aviation industry, which resulted in a growth rate that far exceeded expectations. Such changes are difficult, if not impossible to predict, and there is simply no mathematical way to estimate their impacts. Using a broad spectrum of local, regional and national socioeconomic and aviation information, and analyzing the most current aviation trends, forecasts have been developed and presented in the following sections.

SOCIOECONOMIC PROJECTIONS

Socioeconomic information for Sierra Vista, Cochise County, and Arizona was obtained from the *Socioeconomic Report*, prepared by Sunregion Associates, February 2000. Historical and projected information on population and employment has been used for the forecasting analysis, and summarized in the following paragraphs.

Historical and forecast population for Sierra Vista, Cochise County, and Arizona have been summarized in **Table 2A**. Population in Sierra Vista grew at a faster rate in the 80s (annualized rate of 3.3 percent) than the 90s (annualized rate of 1.8 percent). Cochise County's trend in population growth was just the opposite--growing faster through the 90s. In 1998, Sierra Vista was the 12th largest city in Arizona. The population projections presented in the *Socioeconomic Report* were developed by the Arizona Department of Economic Security (DES).

According to the *City of Sierra Vista Silhouettes: A Statistical Profile*, the largest employer in the City is Fort Huachuca. Data from the Directorate of Resource Management at Fort Huachuca indicates that there were

10,362 military and civilian employees in 1998. Of this total, 5,421 were military (4,310 were employed at the Base, while 1,111 were students at the Base). Other major employers in the area include the Sierra Vista School District, Cochise Community College, Science Application International, Sierra Vista Community Hospital, City of Sierra Vista, SCITEK, and KE&G Construction. The employment projections presented in **Table 2B** are by place of residence. The estimates do not identify the number of jobs that are physically located in the City of Sierra Vista, Cochise County, or the State of Arizona.

TABLE 2A
Historical and Projected Population to 2020
Sierra Vista, Cochise County, and Arizona

Year	State of Arizona	Cochise County	Sierra Vista
1980	2,718,215	85,686	24,937
1990	3,665,228	97,624	34,546
1998 (Est.)	4,764,025	118,492	39,995
Projections			
2005	5,553,849	129,680	43,484
2010	6,145,108	137,035	46,642
2015	6,744,754	143,793	49,795
2020	7,363,604	149,990	52,571

Source: Market Assessment Report, Sunregion Associates, June 2000.

TABLE 2B
Projected Employment to 2020
Sierra Vista, Cochise County, and Arizona

Year	State of Arizona	Cochise County	Sierra Vista
1999 (Est.)	2,301,954	46,755	15,296
2005	2,685,973	50,332	16,607
2010	2,969,777	53,075	17,798
2015	3,257,607	55,596	18,986
2020	3,554,655	57,908	20,033

Source: Market Assessment Report, Sunregion Associates, June 2000.

LOCAL AIR SERVICE AREA

The service areas for airline passengers and based general aviation aircraft will differ, based upon competitive factors from nearby airports. Smaller air carrier airports will generally experience high levels of erosion or

leakage to nearby airports which offer lower fares, better frequency of service to key markets, and larger aircraft. General aviation airports compete with other facilities based upon runway length, services, and hangar/tie-down availability. This master plan effort has the advantage of drawing upon two recent studies which have examined the factors contributing to leakage of airline passengers from Sierra Vista: 1) the *Rural Air Service Study for Arizona* undertaken for the Arizona Department of Transportation, Aeronautics Division, in 1998-1999 (and submitted to Sierra Vista in April 2000), and 2) the *Airline Service Survey, Sierra Vista Market Area,* undertaken by the Cochise College, Center for Economic Research, dated December 15, 1999.

The *Rural Air Service Study* focused on opportunities to improve or provide scheduled commercial airline service to 14 Arizona communities. It was noted in the study that Sierra Vista had the most significant level of passenger erosion among all of the communities examined in the study. While Sierra Vista is a major population center for southeastern Arizona, it is located only 70 miles from Tucson, which contributes to the high level of traffic erosion. The theoretical service area, based upon a 60-minute drive time, extends from Nogales to Douglas on an east-west line, and north of Benson. However, the actual service area is smaller and centered around Sierra Vista, but includes several smaller communities: Benson, Bisbee, Hereford, Tombstone, Huachuca City, Elgin, Fairbank, and St. David.

In the *Rural Air Service Study*, the service area population of Sierra Vista was used to define the potential unconstrained demand for air service. The service area population was estimated to be 52,435. This service area population differs from the figure for service area population used in the *Airline Service Survey*, which defined the service area population at approximately 95,800 . . . the southern half of the county, extending from Whetstone, down to Sierra Vista, and east to Douglas. Regardless of which study is used, the airport has a significant amount of passenger leakage to Tucson, and the City of Sierra Vista is making a dedicated effort to market the airport and reduce the level of leakage.

The *Rural Air Service Study* undertook a travel agent survey to determine passenger travel patterns in the Sierra Vista area. The travel agents reported that 70 percent of their sales were for vacation/personal travel, 27 percent for business, and 3 percent for military travel. However, only 5 percent of their sales were for travel from Sierra Vista Municipal Airport. A total of 63 percent of sales were for travel from Tucson International, while the remaining sales were distributed between Phoenix, Las Vegas, and Mexico. The top destinations identified by the travel agents were: Los Angeles, Las Vegas, San Diego, Mexico, and New York.

According to the agents, additional service to Phoenix and new service to Las Vegas and Salt Lake City would help meet customer (Sierra Vista resident) needs.

The *Airline Service Survey* undertaken in late 1999 asked respondents to identify their primary purpose for travel: 63.3 percent indicated leisure, 11.5 percent business, 19.6 percent government service, and 5.6 percent defense contracting (although many indicated that they fly for several different reasons). Nearly 70 percent of leisure flights were through Tucson International, while another 16.5 percent were through Phoenix Sky Harbor. Sierra Vista Municipal Airport was identified as the departure city for 13.1 percent of the local leisure travel market. California was identified as the top leisure market, while Florida was the second most frequent destination. Other states mentioned by leisure travelers were: Texas, Nevada, Washington, Illinois, Michigan, and Washington, D.C.

A higher percentage of the business travelers in the *Airline Service Survey* identified Sierra Vista Municipal Airport as their origination/termination point (23 percent); however, 65 percent identified Tucson as their origin/destination, while another 12 percent identified Phoenix. The most frequent destinations identified by business travelers: Washington, D.C., California, Arizona, Texas, and Colorado.

Combining leisure and business travelers, the survey provided the following most popular destinations: Washington, D.C./Baltimore, Los Angeles, Las Vegas, Dallas, San Diego, Phoenix, Seattle, Chicago, Atlanta, and Denver.

The general aviation service area is affected by other airfields in the area, which have the potential of providing services to general aviation aircraft. Four other airfields were identified within a 30-mile radius of Sierra Vista: Tombstone, Benson, Bisbee, and Nogales. All have paved runways, with exception to Tombstone. Therefore, the service area for general aviation demand is more closely defined than for scheduled passenger service; consequently, during the analysis of potential aircraft basing demands, the historical basing patterns for the local Sierra Vista area will be examined (rather than for a larger geographic area within the county).

FORECASTS

COMMERCIAL SERVICE FORECASTS

Commercial service forecasts are intended to identify and quantify demand within a given airport's service area. Actual activity is a function of service; this concept incorporates a number of factors, including who provides the service its reliability, cost, and convenience. As part of this master planning effort, in February 2001, the Boyd Group/ASRC, Inc., prepared an *Air Traffic and Revenue Analysis* for Sierra Vista Municipal Airport. This study further supported a substantial local market for commercial air service.

Commercial service at Sierra Vista consists of regional/commuter airline activity, as currently provided by America West Express (Mesa Airlines). Carriers who operate aircraft with 60 seats or less (such as Mesa) are required by the FAA to file DOT Form 298-C. Carriers that operate larger

aircraft are required to file DOT Form 41. Consequently, FAA figures for regional/commuter carriers includes data originating from both DOT forms. By submitting the information to the DOT, the FAA is able to calculate the distribution formulae for airport improvement funds each year. Enplanement figures for calendar year 1998 were used to calculate entitlement funding for fiscal year 2000.

To determine the types and sizes of facilities necessary to properly accommodate present and future airline activity, two basic elements must be forecast: annual enplaned passengers and aircraft operations. From projections of these two indicators, peak period activity levels may be applied to various facility needs assessments in subsequent chapters of the master plan.

PASSENGER ENPLANEMENT FORECASTS

The number of passengers enplaning at Sierra Vista peaked in 1990, when two carriers were serving the airport. The numbers have declined over the past two years, after the number of daily flights declined. The historical figures reported by scheduled carriers and published by the FAA are reflected in **Table 2C**. The most significant consequence associated with the decline was the fact that the official FAA figure in calendar year 1998 fell 471 enplanements short of the 10,000 passenger threshold established by Congress to qualify Sierra Vista Municipal Airport as a primary commercial service airport, resulting in the loss of passenger entitlement funds for fiscal year 2000. Official figures for 1999 have not been released by the FAA; however, the City's figure of 7895 indicates that enplanements have continued to decline. In fact, early figures for 2000 indicate they may have declined even further this year compared to 1999. Speculation on reasons for the decline consider the cost of tickets, the relatively few number of flights and inconvenient connections at the main hub of Phoenix, and the proximity of Tucson as a primary commercial service airport.

Several analytical techniques normally employed in forecasting (primarily regression analysis and time series extrapolation) are not appropriate in the local situation based upon the declining passenger levels over the past few years. However, market analysis and per capita techniques were considered appropriate for this analysis, and can be used with long-range forecast indicators to provide reasonable forecasts of demand.

TABLE 2C
Historical Passenger Enplanements, 1990-1999
Sierra Vista Municipal Airport

Year	Annual Enplaned Passengers
1990	15,215
1991	8,517
1992	9,070
1993	12,983
1994	11,732
1995	10,286
1996	12,786
1997	11,938
1998	9,529
1999	7,895

Source: FAA DOT/TSC ACAIS Database (all years except 1999 which was provided by City of Sierra Vista).

Market analysis was undertaken for the latest five years of data using FAA's latest forecasts for regional/commuter carriers (projections addressed in prior section). The market analysis indicates that Sierra Vista's share of the U.S. market was at its highest level in 1996 (.021 percent), and had declined to .015 percent in 1998 (the latest available published figures for U. S. passengers). Therefore, projections for Sierra Vista were developed for each of these two market shares (.021 and .015). Either forecast results in a high short-term forecast since enplanements continued to decline in 1999 and early 2000. However, the two projections provide market-based forecasts using 1996 or 1998-based historical air service activity.

Projections were also developed using per capita techniques (Sierra Vista population and employment). The per capita population projection was developed using the historical 1996 figure of 0.33 enplanements/population, while the per capita employment projection was developed using the historical 1996 figure of 0.85 enplanements/total employment. Since the population and employment projections presented nearly identical enplanement projections, only the per capita population projections have been shown.

The market share and per capita (population) analysis has been summarized in **Table 2D**.

TABLE 2D
Market Share and Per Capita Analysis
Sierra Vista Municipal Airport

Year	Sierra Vista Enplanements	U.S. Regional Enplanements (000s)	Market Share (%)	Sierra Vista Population	Enplanements Per Capita
1995	10,286	55,800	0.018	37,900	0.271
1996	12,786	60,000	0.021	38,600	0.331
1997	11,938	61,600	0.019	39,300	0.304
1998	9,529	64,600	0.015	39,995	0.238
1999	7,895	72,300 (Est.)	0.011	40,000 (Est.)	0.197
Market Share Projections (.015)					
2005	15,500	103,000	0.015		
2010	19,800	131,700	0.015		
2020	24,900	165,700	0.015		
Market Share Projections (.021)					
2005	21,600	103,000	0.021		
2010	27,700	131,700	0.021		
2020	34,800	165,700	0.021		
Per Capita Projections – Sierra Vista Population					
2005	14,300			43,484	0.33
2010	15,400			46,642	0.33
2020	17,300			52,571	0.33

Sources: FAA DOT/TSC ACAIS Database; FAA Aerospace Forecasts, FY 2000-2011; Socioeconomic Report, Sunregion Associates; FAA Long-Range Aerospace Forecasts, Fiscal Years 2015, 2020, and 2025; Coffman Associates Analysis.

The *Rural Air Service Study* projected a total potential annual demand of 27,305 (50 percent of service area population), while the *Air Service Study* estimated that the annual number of trips by air in the market area (population of 95,811) is 86,787. The FAA's *Terminal Area Forecasts* have projected a static level of 10,528 annual passenger enplanements throughout the planning period. Each of these studies provide a benchmark of comparison against the market share and per capita analyses which were undertaken. Each of the demand projections are summarized in **Exhibit 2D**.

The spread between the high and low forecasts is a reasonable window within which actual passenger enplanements may fall in the future, based upon a number of factors: the number of airlines serving Sierra Vista, frequency of flights, equipment, airfares, non-stop destinations, and the local economy. For planning purposes, a mid-range forecast is generally chosen, if it provides a reasonable growth rate. However, it should be recognized that the actual demand will be very sensitive to each of the aforementioned variables. For this planning study, the market share forecast which was developed with a 0.015 percent share of the U.S. regional/commuter market was chosen as the preferred planning forecast. This projection reaches the potential demand level defined in the *Rural Air Service Study* by the end of the planning period.

COMMERCIAL FLEET MIX

The fleet mix defines a number of key parameters in airport planning, including critical aircraft for airside evaluations and stage length capabilities. A fleet mix projection for Sierra Vista has been developed after reviewing the changes which have taken place over the past few years in fleet composition, and the most recent information available on new aircraft being purchased by existing or potential future carriers serving the airport.

The airport has had scheduled service since the early 80s. The number of departures from the airport remained relatively stable throughout the air service history, peaking in 1988 with 3,422 departures. The average aircraft size increased until the early 90s, when all service began to be provided with 19-seat aircraft. The total number of available seats in the market increased into the late 80s, then remained relatively steady until the total number of departures declined in the last two years.

Regional/commuter airlines are transitioning to advanced turboprops and regional jets to fit their respective market needs. These aircraft have greater seating capacity, stand-up headroom, and lower operating costs. A good example of this transition is the recent decision by Mesa Airlines to purchase 100 ERJ-145 regional jets (36 firm orders over the next two years) for their east coast operation, adding to their existing fleet of Canadair Regional Jets, DHC Dash 8-200Bs, and Beech 1900Ds. Mesa Airlines (operating in the southwest as America West Express) is operating the Canadair Regional Jet, in addition to the Beech 1900D and Dash 8-200 in Arizona markets.

When the *Rural Air Service Study* was undertaken, using 1997 base year data, the airport had seven daily flights by America West Express to Phoenix. In the past year, this frequency has declined to three daily flights (with two daily flights on weekends). All service is being handled with Beech 1900D aircraft, a 19-seat turboprop. The *Rural Air Service Study* identified a potential passenger demand of 27,305 (50 percent of the service area population), and used this demand for route analysis. The Sierra Vista-Phoenix market could (based on the *Rural Air Service Study*) support 19-passenger aircraft on a seven-flight per day/seven-day schedule. It could support the larger 37-passenger Dash 8-200B aircraft on a five-flight per day/seven-day schedule.

The *Rural Air Service Study* considered only turboprop aircraft for the local market. However, if the airport were to recapture more of the locally originating passenger demand, the possibility certainly exists for the airport to receive service with regional jets (which are currently being produced with as few as 32 seats). If regional jets were introduced into Sierra Vista, highly desirable markets such as Los Angeles and Las Vegas would become available, which in turn could stimulate passenger growth. The transition to regional jets by the regional carriers has happened so quickly that some commuter manufacturers are now predicting that the manufacture of turboprop aircraft for scheduled passenger service may be discontinued in the near future, due to a declining number of orders. Some of the regional carriers have already announced their intent to transition to a total jet fleet just as quickly as they can obtain the aircraft.

Reviewing other small regional/ commuter service communities in the country as part of this analysis, it appeared that most communities with fewer than 30,000 annual enplanements continue to be served with turboprop aircraft. However, service with all Dash 8 aircraft was observed in communities with as few as 11,000 enplanements. Several communities with only 30,000 enplanements were receiving a high percentage of their service with small regional jets. This trend (with greater percentages of regional jet service in small communities) should continue through the planning period, as higher numbers of small regional jets become available to serve these markets.

The long-term outlook in fleet transition is dependent on traffic growth, technological improvements, and airfield capabilities. The fleet mix and operations projections have been summarized in **Table 2E**. The fleet mix projections have been used to calculate the average seats per departure, which (after applying a load factor) were used to project annual departures. It is obvious, based upon the assumptions which have been used for aircraft seating capacity, that the frequency of service may decline when larger aircraft enter the market. The commercial fleet mix forecasts may be expected to fluctuate over time as differing mix/frequency combinations are used in the Sierra Vista market.

GENERAL AVIATION FORECASTS

General aviation is defined as that portion of civil aviation which

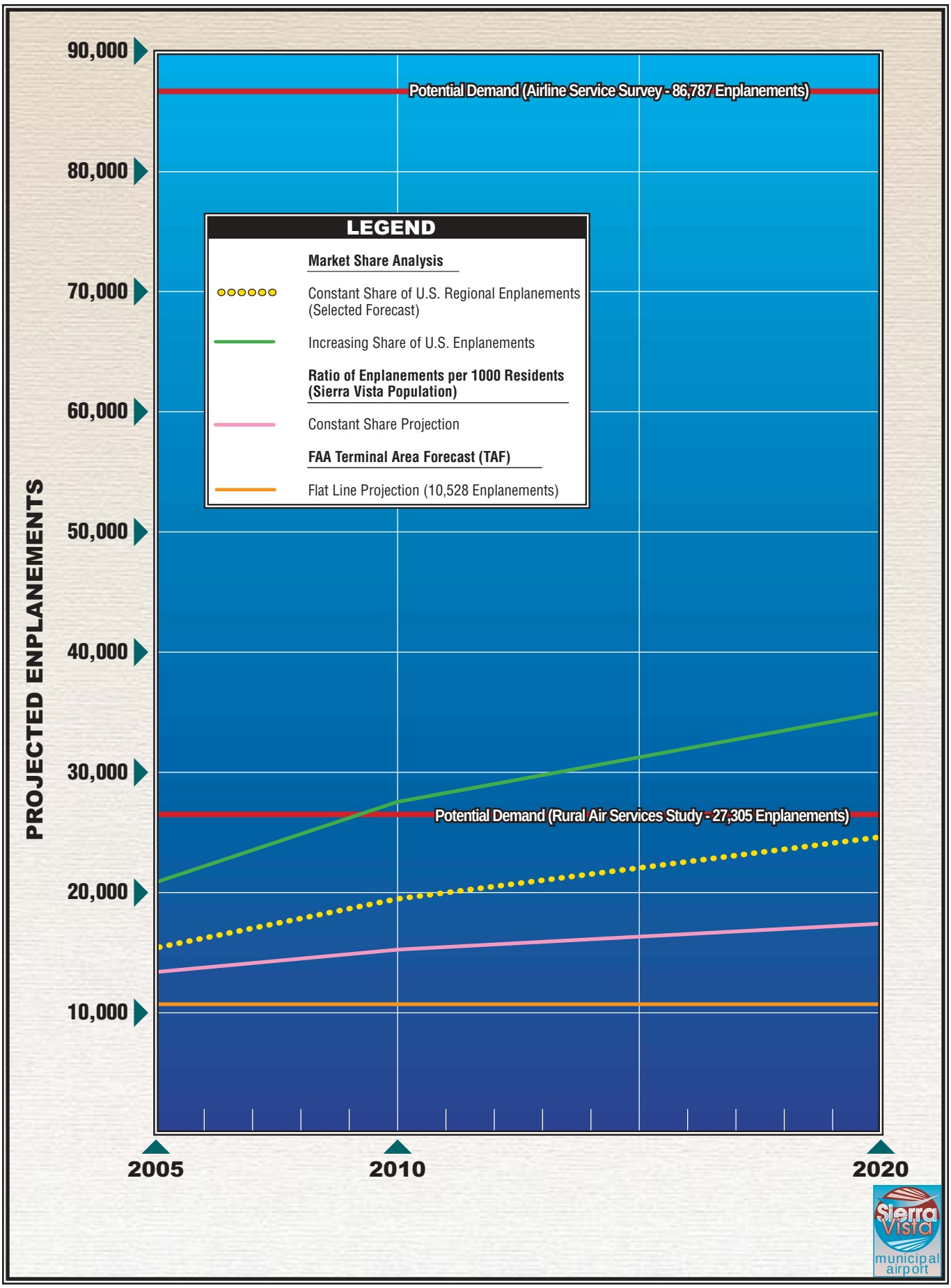


Exhibit 2D
REGIONAL/ COMMUTER
ENPLANEMENT FORECAST

encompasses all facets aviation except commercial and military operations. To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. These indicators of general aviation demand include: based aircraft, fleet mix, and annual operations.

TABLE 2E
Commercial Fleet Mix Forecast
Sierra Vista Municipal Airport

		FORECASTS		
Fleet Mix Seating Capacity	**Existing 1999**	**2005**	**2010**	**2020**
≥ 60	–	–	–	–
40-59	–	–	–	–
20-39	–	50%	75%	100%
≤ 19	100%	50%	25%	–
Avg. Seats Per Departure	19	28	33	37
Boarding Load Factor	.42	.40	.40	.40
Enplanements per Departure	7.9	11.2	13.0	14.8
Annual Enplanements	7,895	15,500	19,800	24,900
Annual Departures	1,000	1,380	1,520	1,680
Annual Operations	2,000	2,760	3,040	3,360

BASED AIRCRAFT AND FLEET MIX PROJECTIONS

The number of based aircraft on the airport is the most basic indicator of general aviation demand and is, in part, determined by the ability of an airport to provide hangars. By first developing a forecast of based aircraft, the growth of other general aviation activities (and demands) can be projected. In the current year (2000), the City of Sierra Vista has counted a total of 54 aircraft based at the airport (51 single-engine and 3 multi-engine). In 1994, there were a total of 35 aircraft based at the airport. Comparing the based aircraft to resident population, the number of aircraft based at the airport per 1,000 population has increased from 0.95 to 1.35 over the past six years.

The total number of aircraft registered in Cochise County in 1998 was 202. This was an increase of 71 aircraft since 1993. This would indicate that Sierra Vista Municipal Airport's market share within Cochise County has remained at 26.7 percent over the past six years.

The number of aircraft registered within the local zip code areas (85635 and 85636) were also examined for the same time period. This number has ranged from 39 in 1993 to 53 in 1997, with the latest count in the first quarter of 2000 at 46. A comparison against the total based aircraft on the airport would

confirm that the airport is attracting based aircraft from outside of Sierra Vista, and that the growth rate for based aircraft is exceeding the growth rate of aircraft registered within the City of Sierra Vista.

The FAA has projected an increase in the total number of active U.S. aircraft, since it is apparent that the general aviation industry has recovered from its decade-long decline. Not only are new aircraft being manufactured, but the FAA is recording an increase in operations at en route traffic control centers. The continued use of general aviation aircraft for business and personal use is anticipated for Sierra Vista Municipal Airport, as it is at the national level. Development of additional property obtained from the Department of the Army is also expected to contribute to an increase in aircraft basing at the airport.

The growth rate in based aircraft since 1993 at Sierra Vista Municipal Airport reflects an average annual growth rate of 7.5 percent, well above the U.S. general aviation active aircraft growth rate of 3.6 percent. Therefore, the increase in aircraft-to-population ratio is considered a better benchmark for projections. This factor has increased at an annual rate of 6.0 percent over the past six years, but is expected to mature at a more moderate rate of growth through the planning period...4 percent through 2010, then 3 percent annually through the remainder of the planning period. This has provided an increasing aircraft-to-population ratio which was applied to population projections for Sierra Vista to obtain the based aircraft projections summarized in **Table 2F**.

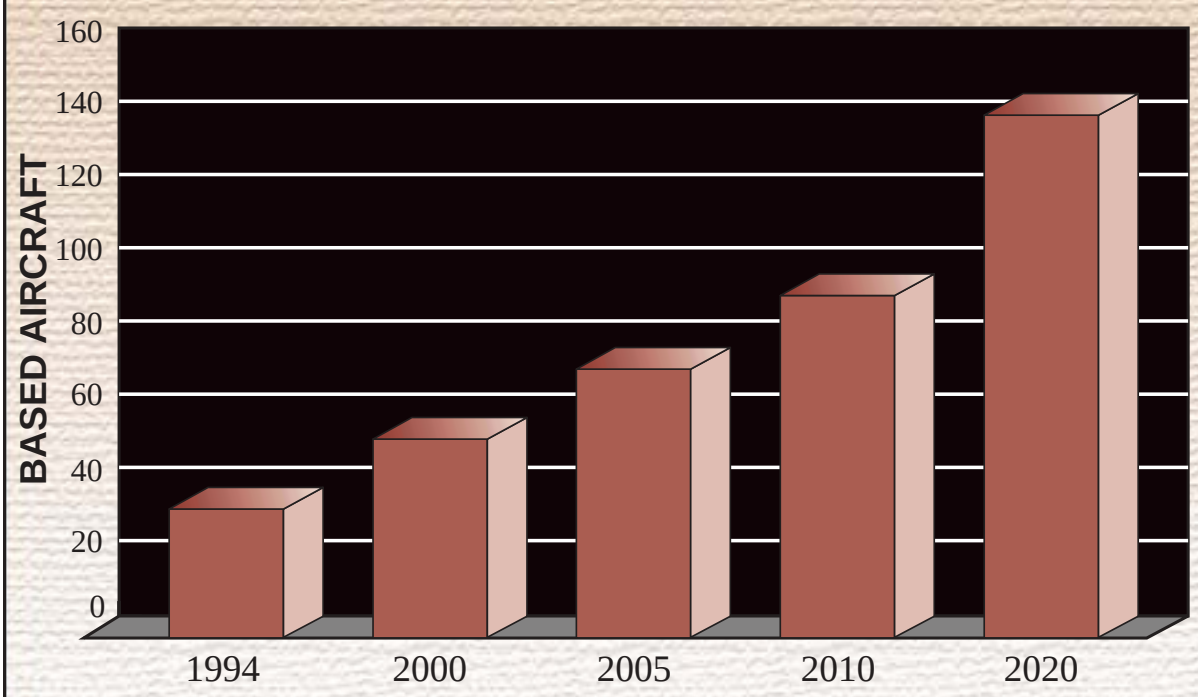
TABLE 2F
Based Aircraft Forecast
Sierra Vista Municipal Airport

Year	Based Aircraft	Sierra Vista Population	Aircraft Per 1,000 Population
1994	35	36,855	0.95
2000	54	40,000	1.35
Projections			
2005	72	43,484	1.65
2010	93	46,642	2.00
2020	142	52,571	2.70

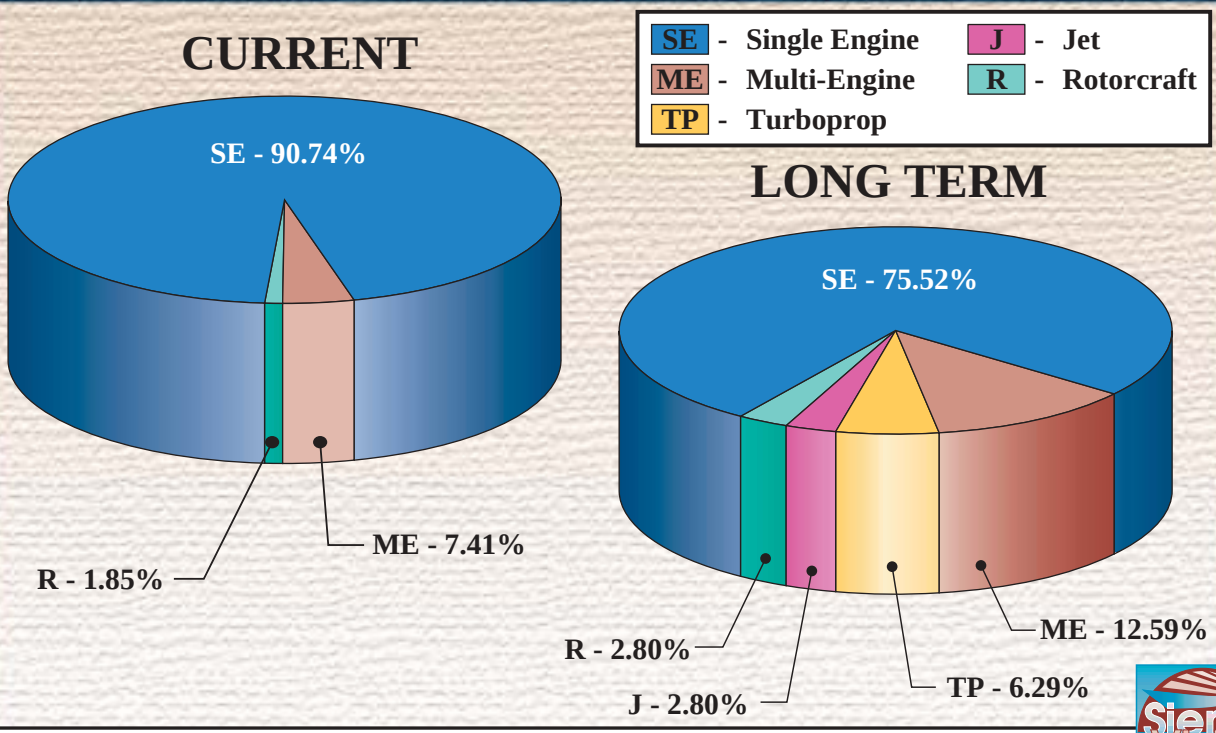
Source: City of Sierra Vista, Coffman Associates Analysis.

The fleet composition is expected to transition to greater percentages of multi-engine aircraft (including turboprops). A fleet mix projection has been reflected in **Exhibit 2E**.

BASED AIRCRAFT



PERCENT BY AIRCRAFT TYPE



Source: Coffman Associates Analysis.

Sierra Vista municipal airport

Exhibit 2E
BASED AIRCRAFT AND
FLEET MIX FORECAST

ANNUAL GENERAL AVIATION OPERATIONS FORECAST

There are two types of general aviation operations recorded at an airport: local and itinerant. A local operation is a takeoff or landing performed by a) aircraft operating in the local traffic pattern, or within site of the tower, b) aircraft known to be departing for, or arriving from, flight in local practice areas located within a 20-mile radius of the control tower, or c) aircraft executing simulated instrument approaches or low passes at the airport. Itinerant operations are all operations other than local.

Typically, operations in the general aviation category are examined based upon the operations-per-based aircraft (OPBA) ratio. The OPBA ratio has declined since 1994, and has varied over the past three years. Therefore, an average of the past three years' OPBA ratio has been used for forecasting purposes. The percentage of local operations (as a percentage of total general aviation operations) has been assumed to remain constant throughout the planning period. The percentage of local operations in 1999 (58 percent) was unchanged from 1994. The operations projections have been summarized in **Table 2G**.

TABLE 2G
General Aviation Operations Forecast
Sierra Vista Municipal Airport

Year	Total G.A. Operations	OPBA Ratio		
1994	14,221	406		
1997	15,756	366		
1998	13,352	284		
1999	15,882	318		
Projections	**Total G.A. Operations**	**OPBA Ratio**	**Local Operations**	**Itinerant Operations**
2005	23,400	325	13,600	9,800
2010	30,200	325	17,500	12,700
2020	46,200	325	26,800	19,400

Source: City of Sierra Vista, Libby Army Airfield TRAFCON, Coffman Associates Analysis.

Note: General aviation operations were adjusted in 1997, 1998, and 1999 to reflect periods of control tower closure. Actual hours of tower operation: 1997 - 12 to 16 hrs./day, 1998 - 9 hrs./day, 1999 - 8 hrs./day. Actual G.A. recorded operations - 1997 - 11,864, 1998 - 10,062, 1999 - 12,050.

MILITARY OPERATIONS FORECAST

Sierra Vista Municipal Airport is a joint-use facility with the Libby Army Airfield. As such, military aircraft constitute a portion of total operational demand. Over the past three years, the military operations have represented 75 percent of total airfield operations. The local operations category represents 80 percent of the total military operations. The operations projections for military traffic used in this report are based upon conversations with representatives from the Libby Army Airfield and Fort Huachuca. Libby Army Airfield Traffic Control has identified that the following aircraft use the airfield: Lockheed C-130 Hercules, General Dynamics F-16 Fighting Falcon, Fairchild Republic A-10 Thunderbolt, Beechcraft King Air, and the Bell UH-1 Iroquois helicopter. Operational demand is predominantly comprised of the F-16, A-10, and King Air, with fewer operations recorded by the C-130 and UH-1. The operational demand and fleet mix has been projected to remain constant throughout the planning period. The figures are summarized in the table at the end of the chapter.

U.S. FOREST SERVICE FORECAST

During fire season, the U.S. Forest Service (USFS) bases aircraft on the airfield. The operations recorded on the airfield vary from year-to-year, based upon the intensity of the fire suppression efforts. In a typical fire season, operations recorded by the USFS may range from 150-400 total operations. The USFS uses a variety of tanker aircraft, with the Lockheed C-130 Hercules representing the largest (and primary tanker designated by the USFS for fire suppression efforts in future years). A separate category has not been established for USFS activity, since it represents such a small percentage of total activity. The operations have been included within the "other commercial/air taxi" and "general aviation" categories.

AIR CARGO OPERATIONS

Operations performed by aircraft for the purpose of transporting air cargo are limited to general aviation aircraft, and are included within the general aviation category. In the future, based upon development of other airport facilities, the airport could be served by aircraft such as the Cessna Caravan (turboprop) or jets (based upon demand). The operations have been included within the "other commercial/air taxi" and "general aviation" categories.

OTHER POTENTIAL USERS

Other private industries have expressed an interest in developing facilities at Sierra Vista Municipal Airport to support aviation-related uses, including aircraft conversion. Potential aircraft associated with a conversion facility could include Boeing 747, C-130, and Boeing 727s. The operations which may be generated within this category have been included within the "other commercial/air taxi" and "general aviation" categories.

PEAKING CHARACTERISTICS

Most facility planning relates to levels of peak activity. Therefore, estimates of peak hour operations and enplanements have been developed to assist with subsequent requirements evaluations. A peak month is defined as the busiest month within the year, while the design day is defined as the average day in the peak month. A design hour is defined as the peak hour in the design day, while the busy day is defined as the busy day of a typical week in the peak month (normally the busy day operations are calculated at 125 percent of the design day operations). The peaking characteristics have been summarized in **Table 2H**.

TABLE 2H
Peaking Characteristics
Sierra Vista Municipal Airport

		FORECASTS		
	Actual 1999	**2005**	**2010**	**2020**
Airline Enplanements				
Annual	7,895	15,500	19,800	24,900
Peak Month (10%)	790	1,550	1,980	2,490
Design Day	26	52	66	83
Design Hour (35%)	9	18	23	29
Airline Operations				
Annual	2,000	2,760	3,040	3,360
Peak Month (10%)	200	280	300	340
Design Day	6	9	10	11
Design Hour (35%)	2	3	4	4
General Aviation Operations				
Annual	15,882	23,400	30,200	46,200
Peak Month (15%)	2,380	3,510	4,530	6,930
Busy Day	99	146	189	289
Design Day	79	117	151	231
Design Hour (15%)	12	18	23	35

Instrument approaches are defined by the FAA as "an approach to an airport with the intent to land by an aircraft in accordance with an instrument flight rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum approach altitude". Reviewing data for the past five years, the recorded level of AIAs on the airfield have been very minimal, and would not substantiate any special navigational aids for landing in low visibility conditions. It is possible that some instrument flight

operations go unrecorded if the pilot chooses to cancel the IFR flight plan prior to making an initial approach fix to the airport.

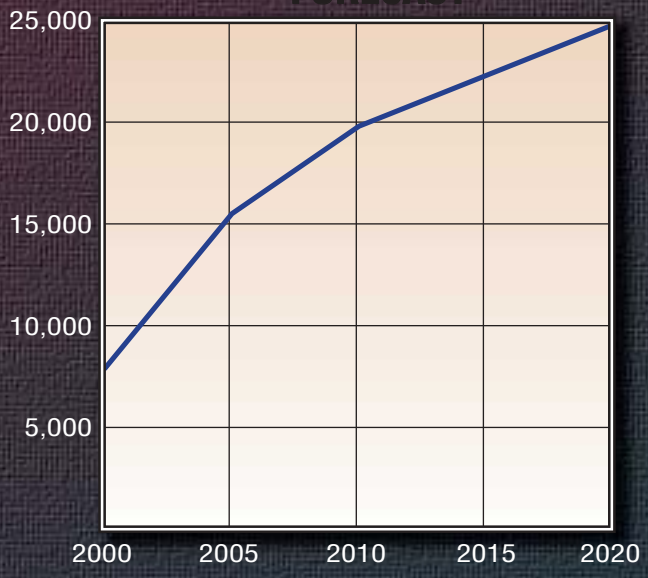
SUMMARY

The forecasts developed for Sierra Vista Municipal Airport have been summarized in **Exhibit 2F**. These forecasts will provide the basis for facility needs assessments in the following chapter.

FORECAST SUMMARY

	Historical	Forecasts		
CATEGORY	**1999/2000**	**2005**	**2010**	**2020**
Annual Operations				
Scheduled Airline	2,000	2,760	3,040	3,360
Other Commercial/Air Taxi	1,361	1,500	2,000	3,000
Military:				
Local	40,300	40,000	40,000	40,000
Itinerant	10,075	10,000	10,000	10,000
Total	50,375	50,000	50,000	50,000
General Aviation:				
Local	9,200	13,600	17,500	26,800
Itinerant	6,682	9,800	12,700	19,400
Total	15,882	23,400	30,200	46,200
Total Operations	**69,618**	**77,660**	**85,240**	**102,560**
Passenger Enplanements	**7,895**	**15,500**	**19,800**	**24,900**
Based Aircraft	**54**	**72**	**93**	**142**

PASSENGER ENPLANEMENTS FORECAST



OPERATIONS FORECAST

Exhibit 2F
PASSENGER ENPLANEMENTS/GENERAL AVIATION FORECAST SUMMARY